CLAIMS

We claim:

1. An apparatus for providing an electrical indication of the fuel level in a fuel tank, the apparatus comprising:

an acoustic transducer for transmitting an acoustic signal and receiving a reflected signal;

a float for remaining buoyant at the surface of the fuel in the tank, said float having a reflective portion positioned to receive said acoustic signal and reflect therefrom said reflected signal; and

an interface circuit connected to said transducer and arranged to measure an elapsed time between transmission of said acoustic signal to receiving of said reflected signal, and produces an output as a function of said elapsed time that is indicative of the fuel level in the fuel tank.

2. The apparatus of claim 1 wherein said reflective portion is concave.

3. The apparatus of claim 1 wherein said reflective portion further comprises a reflective material chosen from metal and epoxy, said reflective portion being integral to said float.

4. The apparatus of claim 1 wherein said float is made from an elastomer having a density from about 9.9-12.6 lb/ft^3.

5. The system of claim 1 wherein said output comprises a resistance.

6. The system of claim 1 wherein said output comprises a current.

7. The system of claim 1 wherein said output comprises a network message.

8. A fuel tank system providing an electrical indication of fuel level in the fuel tank, said system comprising:

a fuel tank having a bottom surface and a top surface in spaced relation thereto;

an acoustic transducer mounted in said top surface, said transducer transmitting an acoustic signal and receiving a reflected signal, said signals travelling along an axis normal to the surface of the fuel;

a float for remaining buoyant at the surface of the fuel in the tank, said float having a reflective portion for receiving said acoustic signal and reflecting therefrom said reflected signal; and

an interface circuit connected to said transducer and arranged to measure an elapsed time between transmission of said acoustic signal to receiving of said reflected signal, and produces an output as a function of said elapsed time that is indicative of the fuel level in the fuel tank.

9. The system of claim 8 further comprising a centering rod parallel to said axis and having an upper end and a lower end, said upper end of said centering rod being fixed at said top surface and in spaced relation to said acoustic transducer, said lower end being located at said bottom surface, and said float being in sliding engagement with said centering rod;

10. The system of claim 8 wherein said reflective portion is concave.

11. The system of claim 8 wherein said reflective portion further comprises a reflective material chosen from metal and epoxy, said reflective portion being integral to said float.

12. The system of claim 8 wherein said float is made from an elastomer having a density from about 9.9-12.6 lb/ft^3.

13. The system of claim 9 wherein said float further comprises an index feature and said centering rod further comprises a mating feature for sliding engagement with said index feature and preventing said float from rotating about said centering rod.

14. The system of claim 9, said float further comprising a friction reducing feature for contacting the centering rod.

15. The system of claim 9 further comprising a spring for biasing said centering rod against said bottom surface,

16. The system of claim 8 wherein said output comprises a voltage.

17. The system of claim 8 wherein said output comprises a resistance.

18. The system of claim 8 wherein said output comprises a current.

19. The system of claim 8 wherein said output comprises a network message.

20. A method for measuring the level of fuel in a fuel tank, the method comprising:

providing a reflective float on the surface of the fuel;

from a fixed transducer, transmitting an acoustic wave and receiving a wave reflected back from the reflective surface;

measuring the time elapsed between transmitting of the acoustic wave and receiving the reflected wave; and

determining the level of fuel in the tank as a function of the measured elapsed time.

21. The method of claim 19 wherein said reflective float has a parabolic surface for reflecting said acoustic wave.